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Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. to 14. (Canceled)

15. (Currently amended) A method for controlling gas cooling in a gas pipeline having a heat exchanger at a compressor station, the method comprising the steps of: ~~The method of claim 1 in which the observations of step A comprise~~

    A) obtaining observations of parameters that are characteristic of gas flow through the compressor station under a set of operating conditions having a corresponding energy cost [[;]] , the observations comprising gas temperature at the inlet of the heat exchanger, gas temperature at the outlet of the heat exchanger, ambient air temperature and pressure, gas pressure at the inlet of the heat exchanger, gas pressure loss across the heat exchanger, estimated gas flow rate through the heat exchanger and periodic estimated gas flow through the heat exchanger bypass valve, and compressor station [[.]] ;

    B) from the observations of step A, determining a balance between gas cooling and heat exchanger gas pressure loss that results in an improvement of energy savings by comparison with the energy cost of the set of operating conditions; and

    C) operating a bypass valve on the gas pipeline to divert an amount of gas into the heat exchanger that achieves the balance determined in step B.

16. to 18. (Canceled)

19. (Currently amended) The method of claim [[1]] 15 further comprising the steps of:

    finding the expected pressure differential across the heat exchanger at a level of gas

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flow rate;

finding the actual pressure differential across the heat exchanger at a level of gas flow

rate;

finding a relationship between the actual pressure differential and expected pressure

differential across the heat exchanger at the level of gas flow rate; and

finding the degree of internal fouling of the heat exchanger from the relationship found

in the preceding step.

20. (Original) The method of claim 19 further comprising the step of:

adjusting the determination of step B for the gas flow rate through the heat exchanger.

21. (Original) The method of claim 19 further comprising the step of:

recording the increase in pressure differential across the heat exchanger tubes for

future maintenance action.

22. (Currently amended) The method of claim [[1]] 15 further comprising the steps of:

finding the original dirty overall heat transfer coefficient for the heat exchanger at a

level of cooling and gas flow rate;

finding the original clean overall heat transfer coefficient for the heat exchanger at a

level of cooling and gas flow rate;

finding a relationship between the original dirty and clean overall heat transfer

coefficient at the level of cooling and gas flow rate; and

finding the original fouling resistance for the heat exchanger from the relationship

found in the preceding step.

23. (Currently amended) The method of claim [[1]] 15 further comprising the steps of:

finding the actual current dirty overall heat transfer coefficient for the heat exchanger

at a level of cooling and gas flow rate;

finding the actual current clean overall heat transfer coefficient for the heat exchanger

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at a level of cooling and gas flow rate;

finding a relationship between the actual current dirty and clean overall heat transfer

coefficient at a level of cooling and gas flow rate; and

finding the actual current fouling resistance for the heat exchanger from the

relationship found in the preceding step.

24. (Original) The method of claim 19 further comprising the steps of:

finding a relationship between the original fouling resistance and actual current fouling

resistance for the heat exchanger at level of cooling and gas flow rate; and

finding the degree of internal and/or external fouling of the heat exchanger from the

relationship found in the preceding step.

25. (Original) The method of claim 24 further comprising the step of:

adjusting the determination of step B for the gas flow rate through the heat exchanger.

26. (Original) The method of claim 24 further comprising the step of:

recording the increase in internal and/or external fouling of the heat exchanger tubes

for future maintenance action.

27. to 32. (Canceled)

33.   (Currently amended) The method of claim [[4]] 15 in which the determination of step

B takes into account compression power requirements in the pipeline downstream of the

compressor.

34.   Canceled.